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Policy and Planning Department
Greater Vancouver Regional District

Population Density

In Greater Vancouver:

1991-2001

Creating Our Future
... steps to a more livable region

The Livable Region Strategic Plan

106-06600/

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EXECUTIVE SUMMARY

This paper analyzes trends in population densities within Greater Vancouver between 1991 and 2001, in order to provide insight into the relationship between observed patterns of density and the growth management objectives of the Livable Region Strategic Plan (LRSP). The analysis focuses on population density in the portions of the region outside the Green Zone, which is protected from urban development.

The density of the region's Growth Concentration Area (GCA) rose by 24% between 1991 and 2001, reaching an average density of 32.5 persons/ha in 2001, more than twice that of the rest of the region at 13.4 persons/ha. By 2001 the average density of Greater Vancouver outside the Green Zone was 22.2 persons/ha. The pursuit of higher densities is a key goal in the LRSP, and is supported through the planning and development practices at the local level, and by the spatial limits to growth established by Greater Vancouver's natural barriers (the mountains and the ocean), and the administrative boundaries provided by the provincial Agricultural Land Reserve and the Green Zone.

All of Greater Vancouver's sub-regions became denser during the study period, with the highest percentage gains experienced in North Surrey/North Delta (37.3%) and the Northeast Sector (35.7%). The highest absolute gains were in Vancouver/UEL (7.1 persons/ha) and North Surrey/North Delta (6.7 person/ha). Vancouver/UEL remained the densest sub-region throughout the study period, and at 51 persons/ha in 2001, it was significantly more dense than the next-most dense sub-region (Burnaby/New Westminster) at 30.6 persons/ha. The lowest percentage and absolute increases in density were experienced in the North Shore sub-region, which grew by 1.6 persons/ha (10.4%).

Every GVRD municipality became denser during the study period, although the range of growth was significant. New Westminster experienced the highest absolute growth at 7.7 persons/ha, although Vancouver (7.1 persons/ha) and Port Coquitlam (6.9 persons/ha) were not far behind. Aside from the three villages, West Vancouver had the lowest absolute growth at 0.7 persons/ha. Surrey had the highest percentage growth at 41.5%. Vancouver remained the most dense city in the region at 52.7 persons/ha in 2001, with the City of North Vancouver (41 persons/ha), White Rock (39.7 persons/ha) and New Westminster (37.8 persons/ha) rounding out the group of cities with the highest densities. Coquitlam, New Westminster, Port Coquitlam, Richmond and Surrey had absolute and percentage growth in density which exceeded the regional average, while Delta, the District of North Vancouver, West Vancouver and White Rock had absolute and percentage growth that were below the regional average.

Changes in regional town centre population density between 1991 and 2001 ranged from a small increase in density in Maple Ridge Town Centre (0.7 persons/ha), to large increases in Coquitlam Centre (36.9 persons/ha) and Metrotown (33.5 persons/ha). Coquitlam, Langley and Richmond town centres experienced more than a 50% increase in their respective population densities. The Vancouver metropolitan core also experienced a large absolute and percentage increase in density. By 2001 the eight regional town centres had an average density of 50.4 persons/ha. Metrotown, the metropolitan core and Lonsdale all have distinctly higher densities than the other centres, with Metrotown being the densest at nearly 110 persons/hectare.

Taken together, the increased population density observed in the region's major centres is consistent with the growth management objectives of the LRSP. However, the individual results vary widely and likely for a range of reasons. It was known during the crafting of the LRSP that different centres would mature at different rates, and would ultimately play different functions within their communities. It may nevertheless be worthwhile considering additional ways of measuring the growth of Greater Vancouver's centres to address these differences, facilitate comparative analysis, assess how well the individual centres are achieving the region's growth management objectives for them, and determine the appropriate services and support they need to help them grow sustainably.

The Expo Line SkyTrain corridor experienced a 32.4% growth in population density within 1000 metres of its stations between 1991 and 2001. By 2001 the average density of Expo Line station areas was 50.7 persons/ha, nearly the same as the average for the regional town centres. The recently completed Millennium Line SkyTrain extension had a 2001 population density of 27.9 persons/ha within 1000 metres of its stations, which is roughly comparable to the Expo Line's average of 34.4 persons/ha when it opened in 1986.

Overall, the LRSP's objective to increase population densities is being realized. That said, the rate of progress varies considerably throughout the region, which warrants continued attention and potentially new indicators. The ultimate success of the LRSP's objectives for higher densities will depend on population, housing and household trends, preservation of the Green Zone, and a sustained commitment to pursuing compact communities, amongst other factors. Achieving significantly higher densities would almost certainly mean continued strong growth in the number of duplexes, rowhouses and apartments throughout the region, more residential infill and secondary suites, more mixed-use development in previously single-use areas, and more re-use of former industrial lands and underutilized commercial development. Strategic transportation investments to reinforce the desired land use pattern will also play a key role in meeting the region's growth management objectives.

1. INTRODUCTION

1.1 Purpose

The purpose of this paper is to summarize the changes in Greater Vancouver's population density between 1991 and 2001. [1] The primary sources of data for this study are the 1991, 1996 and 2001 Censuses. This paper is part of a series being prepared by the GVRD, in conjunction with the LRSP monitoring program, the statutory review of the LRSP, and the Sustainable Region Initiative.

1.2 Growth Management and the LRSP

The Livable Region Strategic Plan (LRSP) is Greater Vancouver's regional growth strategy. It was adopted by the GVRD Board of Directors in January, 1996 with the support of all member municipalities. Since its adoption, the Strategic Plan has provided the framework for making regional land use and transportation decisions that reinforce the regional vision. The vision for managing regional growth rests on four fundamental strategies:

- **Protect the Green Zone**: The Green Zone is made up of the region's farmland, watersheds, ecologically sensitive areas and key recreation lands. It defines the limits to urban expansion, protects Greater Vancouver's natural heritage and contributes to environmental sustainability.
- **Build Complete Communities**: Having more complete communities means people could live, work and play without having to travel great distances to do so. The concept hinges on a network of town centres distributed throughout the region which serve as the primary concentrations of jobs, housing, culture and recreation opportunities.
- **Achieve a Compact Metropolitan Region**: This strategy would see most residential growth concentrated in the region's core municipalities, identified in the Strategic Plan as the "Growth Concentration Area" (GCA). This concentration of growth reduces development pressure on the Green Zone, and makes it easier to provide a better balance of jobs and housing in close proximity with improved transit service.
- **Increase Transportation Choice**: This strategy seeks to provide more and better transportation alternatives to the private automobile. As the region's population grows, we need to reduce our dependency on the private automobile if we are to have any chance of addressing air pollution, congestion and the spiraling public costs associated with them.

A fundamental goal of the LRSP is to concentrate growth and increase residential densities as the population expands. There are many reasons to do this:

- Land consumption: concentrated, denser development requires less land, which increases the region's capacity to accommodate growth, and preserves options for the future development or retention of the remaining lands.
- Efficiency: concentrated development is easier to service with utilities and other infrastructure, makes better use of infrastructure that is already in-place, uses less energy, and reduces overall public costs for servicing growth.

[1] Since 1996 Greater Vancouver has been equivalent to the Vancouver CMA.

- Environmental protection: concentrated development reduces development pressure on our waterways and natural/agricultural areas, reduces the amount of impervious surface, and destroys less habitat.
- Transit service: concentrated development is easier and more cost-effective to serve by transit. We reduce our dependence on the automobile when concentrations of housing are connected to concentrations of jobs by a network of high quality, high capacity transit services.
- Walking and cycling: concentrated development encourages other, non-motorized modes of travel, such as walking and cycling, since the distances between housing, jobs and day-to-day services are reduced.
- Housing affordability: developing a range of medium and higher density housing types provides options for prospective home owners and renters, and improves housing affordability.
- Local services: concentrated development attracts commercial and other local services, thereby reducing the need to travel great distances to access them.

1.3 Study Geographies

This paper presents and analyzes population density based on several spatial patterns or "geographies", which are intended to provide insight into the relationship between observed changes in population density and the growth management objectives of the LRSP. The geographies analyzed in this study include:

- The GVRD
- The Growth Concentration Area (see illustration in Attachment 2).
- GVRD sub-regions
- Municipalities
- Regional town centres
- Transit corridors

1.4 Land Base

This report assesses population densities for the portion of the region outside the Green Zone, which is protected from urban development. As such, the focus herein is on population density in the urban and urbanizing portions of Greater Vancouver.

This land base yields a common form of "gross" population density, since a significant amount of non-residential land is included in the calculations. Other ways of conducting residential density analysis include purely "gross" measures, which include virtually all land regardless of use (eg. wetlands, watersheds or farmland), or "net" residential density measures, which can exclude all non-residential uses, whether ancillary to residential or not. Needless to say, the analytical approach influences the results. The approach used in this paper recognizes that the Green Zone is protected from urban development, and an urban community's density and form is perceived based on the entirety of the built environment, not just selected uses.

This approach to defining and measuring the land base of a region for monitoring residential densities is similar to that used by agencies such as the US National Resources Inventory and the Brookings Institute, as well as reference documents such as "An International Sourcebook of

Automobile Dependence in Cities" (Kenworthy and Laube, 1999). Attachment 1 identifies the specific land base used in this paper.

1.5 Residential Densities in Context

When considering the topic of residential density, it is helpful to have some context to make the figures more meaningful. Direct comparison of residential densities with other city-regions is problematic, since different jurisdictions define "metropolitan area" and "urbanized area" in different ways, and produce data for different time periods. More useful in providing a concrete sense of what different urban densities look like "on the ground" is to examine the densities of familiar neighbourhoods in different regional contexts. To this end, the following table shows the growth in population and density for four "newer" neighbourhoods and six established neighbourhoods in Greater Vancouver between 1991 and 2001.

Table 1. Population and Density of Selected Greater Vancouver Neighbourhoods: 1991-2001[1]

Neighbourhood	Land Area[2] (ha)	Population (Density in Persons/ha)			Change in Population (Density)
		1991	1996	2001	1991-2001
Newer Neighbourhoods[3]					
Fleetwood (Surrey)	1,690	25,390 (15.0)	35,200 (20.8)	43,700 (25.9)	18,310 (10.8)
Walnut Grove (Langley Township)	700	10,560 (15.1)	17,005 (24.3)	22,525 (32.2)	11,965 (17.1)
West Cambie (Richmond)	255	2,885 (11.3)	5,340 (20.9)	5,535 (21.7)	2,650 (10.4)
Westwood Plateau (Coquitlam)	415	815 (2.0)	8,450 (20.4)	14,295 (34.4)	13,480 (32.4)
Lower Density Neighbourhoods					
British Properties (West Vancouver)	575	5,485 (9.5)	5,625 (9.8)	5,400 (9.4)	-85 (-0.1)
Shaughnessy (Vancouver)	445	9,270 (20.8)	9,090 (20.4)	9,010 (20.2)	-260 (-0.6)
Medium Density Neighbourhoods					
Maillardville (Coquitlam)	135	4,210 (31.2)	4,770 (35.3)	5,120 (37.9)	910 (6.7)
Steveston (Richmond)	555	19,885 (35.8)	20,850 (37.6)	22,340 (40.3)	2,455 (4.4)
Higher Density Neighbourhoods					
Kitsilano (Vancouver)	505	34,535 (68.4)	36,580 (72.4)	39,385 (78.0)	4,855 (9.6)
West End (Vancouver)	180	38,410 (213.4)	40,940 (227.4)	42,155 (234.2)	3,745 (20.8)

Notes:

1. Sources: Census Canada. Neighbourhood boundaries provided by municipal staff. Density figures generated by GVRD.
2. "New neighbourhoods" were undeveloped or developed at very low densities in 1991 and experienced significant growth 1991-2001.
3. Area net of Green Zone lands, if applicable.

There is no definitive way to characterize specific densities as being "good" or "bad", "dense" or "not dense." Density is a relative measure best used to track progress towards stated goals regarding the shape, nature and needs of a community. For example, measuring density can assist in determining when a community can support public infrastructure investment, such as transit. It

is also a useful indicator of how much land is used or needed to accommodate growth, since low density development tends to consume more land than higher density development. Similarly, there is no right or wrong way to achieve higher densities. Smaller lots, less road space, multiple units, mixed use, infill, "brownfield" development and "greyfield" development are some of the current basket of techniques used to achieve a more efficient development pattern through higher densities.

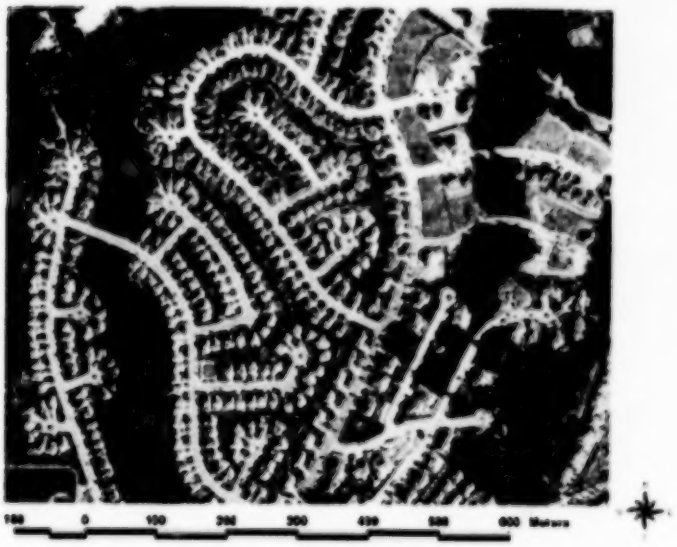
Consider the two residential areas shown in Figure 1. Both cover the same area, both are primarily comprised of single family dwellings, both have trees and other green space. Yet because of their road patterns, lot sizes and general lay out, one has twice the density of the other (not counting the possibility of secondary suites). One neighbourhood is not "better" than the other, but they clearly consume land differently, and offer a very different urban form.

The Livable Region Strategic Plan does not contain specific residential density targets. However, in addition to establishing population and housing targets, a Growth Concentration Area and a network of regional town centres, the plan supports increased densities through the following policies:

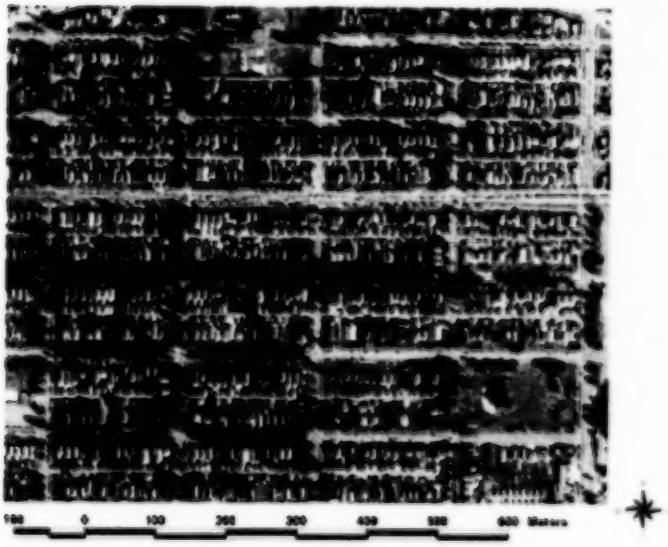
> *Development of a network of high quality, mixed activity urban centres supported by an appropriate level of public transit and a range of community services and cultural facilities for residents and employees.*
>
> *Achievement of adequate population and employment densities in centres and transportation corridors to support planned transit services.*

The region's long-range transportation plan, Transport 2021, is a companion document to the LRSP. Transport 2021 reinforces the LRSP's goals to increase residential densities by calling for more intense residential development targeted to centres and corridors which could support transit services. The transportation plan supports medium and higher density residential areas balanced with a full range of services and employment activities to reduce overall travel demand, especially by the private automobile. It also supports residential intensification through the gradual infill of existing lower-density neighbourhoods, in order to accommodate growth and reduce travel demand and cost.

Figure 1. Two Equivalent Area Residential Neighbourhoods



- Cul-de-sac subdivision pattern
- Mostly single family dwellings
- Approx. 6 units/ha (gross)



- Grid street pattern
- Lanes and cross streets
- Mostly single family dwellings
- Approx. 13 units/ha (gross)

2. REGIONAL POPULATION DENSITY

The following table summarizes the population density of Greater Vancouver at the broadest scales: the region and the Growth Concentration Area (GCA). In this and the following tables, the population density of Maple Ridge and Pitt Meadows has been added to the regional total for 1991, even though these communities did not join the GVRD until 1995.

Table 2. Regional Population Density: 1991-2001

Area	Land Base (ha)	Population Density (persons/ha)			Change in Density 1991-2001	
		1991	1996	2001	Actual	Percent
GCA	39,655	26.2	29.7	32.5	6.3	24.0%
Rest of GVRD	46,710	10.9	12.6	13.4	2.6	23.9%
GVRD Total	86,365	17.9	20.5	22.2	4.3	24.0%

Note: The land base is net of Green Zone area.

The density of the GCA and non-GCA areas rose during the study period by about the same percentage (24%), although the absolute density increase in the GCA was more than double that of the rest of the region. The density increase is made all the more significant when one considers the size of the GCA, which covers nearly half (46%) of the region's land base outside the Green Zone. While the LRSP does not contain specific density targets, this trend towards increasing densities is nevertheless consistent with the policy objectives to develop a compact urban form, and gradually increase overall residential density.

The gains in density described in Table 2 reflect the fact that the region has two kinds of spatial limits to growth: the natural barriers, including the mountains and ocean, and the administrative boundaries, in particular the provincial Agricultural Land Reserve (ALR) and the Green Zone. Without the Green Zone and the ALR within it, the region may not have achieved the density increases shown in Table 2, since farmland and other protected areas would have been available for urbanization. This has been one of the principle drivers of urban sprawl in the metropolitan areas of the United States, where the availability of relatively inexpensive private land outside urbanized areas has helped spur an inefficient growth pattern, exacerbated by fragmented water/sewer systems, an ever-expanding highway network, and the process of municipal annexation. Yet in recent years, many formerly sprawling US metropolitan areas are finding that the availability of things like fresh water and natural geographic barriers are defining the spatial limits to horizontal growth. Recent density increases in Los Angeles are in part attributed to these factors. In addition, a few US metropolitan areas which may not have the same physical constraints to growth have nevertheless made progress in curbing sprawl by establishing formal urban growth boundaries (eg. Metro Portland).

Notwithstanding Greater Vancouver's spatial limits to urban development, and the obvious progress the region has achieved in increasing overall residential densities, it remains important to examine density patterns at smaller scales in order to better understand the more detailed trends which together add up to the aggregate result described in Table 2.

3. SUB-REGIONAL POPULATION DENSITY

Greater Vancouver can be divided into eight sub-regions, as follows:

SUB-REGION	MUNICIPAL COMPONENTS[2]
Vancouver/UEL	City of Vancouver, Portion of Electoral Area A (UBC and University Endowment Lands)
Burnaby/New Westminster	Burnaby and New Westminster
Northeast Sector	Coquitlam, Port Coquitlam, Port Moody, Anmore and Belcarra
North Surrey/North Delta	North Surrey, North Delta
North Shore	North Vancouver, District of North Vancouver, West Vancouver, Lions Bay, Portion of Electoral Area A, Bowen Island[3]
Richmond	City of Richmond
South Region/Langleys	South Surrey, South Delta, White Rock, City of Langley, Township of Langley
Maple Ridge/Pitt Meadows	Maple Ridge and Pitt Meadows

Grouping Greater Vancouver's communities into these sub-regions reflects the natural geographic boundaries and historical development patterns in the region, which assists in regional land use and transportation planning. Table 3 describes changes in population density for the region's eight sub-areas.

It is important to note that a comparison of sub-area residential densities needs to consider the unique characteristics of each area, and the relative stage of urbanization each sub-area finds itself in. This paper assesses population density using a land base comprised of all lands outside the protected Green Zone. Several sub-areas, particularly those outside the GCA, have large tracts of land outside the Green Zone classified as "open and undeveloped", which has no residential development, or "rural residential", which has a very low residential density. This naturally reduces the density of these areas at this scale, and underscores the fact that these sub-areas have a shorter history of urbanization than the more central areas such as Burnaby/New Westminster and Vancouver/UEL.

[2] Each sub-region includes all immediately adjacent Indian Reserves.

[3] In 1999 Electoral Areas A and C were amalgamated into Electoral Area A, and Bowen Island became a separate municipality. The tables consistently include the UBC/UEL populations as part of the Vancouver sub-region, and the North Shore portion of the Electoral Area(s) plus Bowen Island as part of the North Shore sub-region.

Table 3. Population Density in Greater Vancouver Sub-Regions: 1991-2001

GCA Sub-Regions	Land Base (ha)	Population Density (persons/ha)			Change in Density 1991-2001	
		1991	1996	2001	Actual	Percent
Burnaby/New Westminster	8,115	24.9	28.2	30.6	5.7	22.8%
Northeast Sector	8,940	15.6	19.0	21.1	5.6	35.7%
North Surrey/North Delta	12,275	18.0	22.0	24.7	6.7	37.3%
Vancouver/UEL	10,875	43.8	47.9	50.9	7.1	16.2%
Non-GCA Sub-Regions						
Maple Ridge/Pitt Meadows	9,920	5.4	6.3	7.0	1.6	30.3%
North Shore	9,525	15.2	16.2	16.8	1.6	10.4%
Richmond	7,115	16.9	19.9	22.1	5.2	30.5%
South Region/Langleys	19,600	9.7	11.2	12.1	2.4	25.0%
GVRD Total	86,365	17.9	20.5	22.2	4.3	24.0%

Note: The land base is net of Green Zone area.

All sub-regions became denser over the study period, with the highest percentage gains experienced in North Surrey/North Delta and the Northeast Sector, both of which are in the GCA. The highest absolute increases in density were in Vancouver/UEL and North Surrey/North Delta, although all four GCA sub-regions saw similar increases. Richmond, which is located outside the GCA, experienced a density increase which was comparable to that observed in the GCA sub-regions. Vancouver/UEL remains by far the densest sub-region in Greater Vancouver at nearly 51 persons/hectare, which is essentially the same as the average density for the regional town centres (see Page 10). As a sub-region, Maple Ridge/Pitt Meadows continued to have a very low density, although as noted earlier, this reflects the early stage of urbanization these communities find themselves in, as well as their large land base relative to population. An important observation is that three of the four sub-areas outside the GCA (Maple Ridge/Pitt Meadows, Richmond and South Region/Langleys) experienced a percentage growth in population density that exceeded the regional average, which means these areas are contributing towards the goal to accommodate growth through higher residential densities.

4. MUNICIPAL POPULATION DENSITY

Table 4 summarizes the changes in population density experienced by Greater Vancouver's municipalities between 1991 and 2001. Bowen Island is included in the figures for Electoral Area 'A', since it did not become a municipality until 1999, and disaggregated data for that community is not available for earlier years.

Table 4. Population Density in Greater Vancouver Municipalities: 1991-2001

		Population Density (persons/ha)			Change in Density 1991-2001	
Municipality	Land Base (ha)	1991	1996	2001	Actual	Percent
Anmore	450	0.9	1.2	1.5	0.6	62.4%
Belcarra	115	2.1	2.4	2.5	0.3	16.3%
Burnaby	6,670	23.8	26.9	29.1	5.3	22.1%
Coquitlam	4,615	18.2	22.1	24.5	6.3	34.4%
Delta	4,890	17.3	18.5	18.8	1.5	9.0%
Electoral Area 'A'	1,730	3.0	4.5	5.1	2.1	68.4%
Langley City	860	23.0	26.2	27.5	4.5	19.6%
Langley Township	6,000	8.2	10.0	11.0	2.8	33.9%
Lions Bay	260	5.1	5.4	5.3	0.2	3.8%
Maple Ridge	8,215	5.4	6.2	7.0	1.6	30.2%
New Westminster	1,445	30.2	34.2	37.8	7.7	25.4%
North Vancouver City	1,080	35.6	38.4	41.0	5.4	15.3%
North Vancouver District	3,255	20.4	21.8	22.4	1.9	9.5%
Pitt Meadows	1,705	5.5	6.7	7.2	1.7	31.1%
Port Coquitlam	2,090	17.6	22.3	24.5	6.9	39.4%
Port Moody	1,670	10.6	12.5	14.3	3.6	34.1%
Richmond	7,115	16.9	19.9	22.1	5.2	30.5%
Surrey	19,660	12.2	15.2	17.3	5.1	41.5%
Vancouver	10,345	45.6	49.7	52.7	7.1	15.6%
West Vancouver	3,730	10.1	10.7	10.8	0.7	6.8%
White Rock	460	35.5	37.4	39.7	4.2	11.9%
GVRD Total	86,365	17.9	20.5	22.2	4.3	24.0%

Note: The land base is net of Green Zone area.

The density of every GVRD municipality grew between 1991 and 2001, although the range of growth was significant. West Vancouver had the lowest actual growth (0.7 persons/ha), while New Westminster had the highest growth at 7.7 persons/ha. Surrey had the highest percentage increase in population density at 41.5%, while West Vancouver experienced the lowest percentage growth at 6.8%. Coquitlam, New Westminster, Port Coquitlam, Richmond and Surrey experienced an absolute and percentage growth in population density that exceeded the regional averages. Delta, North Vancouver District, West Vancouver and White Rock experienced an absolute and percentage growth below the regional averages. Note that these comparisons do not include the figures for the Electoral Area or the villages of Lions Bay, Anmore and Belcarra. Vancouver retained its position as the densest city in the region (52.7 persons/ha), with the City of North Vancouver, White Rock and New Westminster rounding out the four highest density cities.

The four cities which experienced the highest absolute increases in density were all located within the GCA, including New Westminster, Vancouver, Port Coquitlam and Coquitlam. The increases

in density seen in Surrey are noteworthy, given that Surrey has a non-Green Zone land base that is nearly double that of the next largest city (Vancouver).

5. REGIONAL TOWN CENTRE POPULATION DENSITY

The following table presents the population densities of the regional town centres (RTCs), which are identified on the map in Attachment 2. Also included is the Vancouver metropolitan core, which while not technically a regional town centre, is nevertheless the largest concentration of population in the region.

Table 5. Population Density in Regional Town Centres: 1991-2001

Regional Town Centre	Land Base (ha)	Population Density (persons/ha)			Change in Density 1991-2001	
		1991	1996	2001	Actual	Percent
Coquitlam Centre	125	12.5	35.7	49.4	36.9	295.8%
Langley Town Centre	630	13.7	17.2	21.0	7.3	53.3%
Lonsdale (North Van. City)	255	70.5	78.1	88.4	17.8	25.3%
Maple Ridge	145	26.4	26.0	27.1	0.7	2.7%
Metrotown (Burnaby)	220	76.3	95.5	109.7	33.5	43.9%
New Westminster	100	52.5	66.6	65.7	13.2	25.1%
Richmond Centre	440	39.6	52.9	65.1	25.4	64.2%
Surrey City Centre	520	26.5	30.3	33.0	6.5	24.5%
Total RTCs	2,430	35.1	43.5	50.4	15.3	43.6%
Vancouver Metro Core	925	65.6	78.9	94.8	29.2	44.5%
GVRD Total	86,365	17.9	20.5	22.2	4.3	24.0%

Note: The land base is net of Green Zone area, where applicable.

Changes in regional town centre population density between 1991 and 2001 ranged from a small increase in density in Maple Ridge (0.7 persons/ha), to large increases in Coquitlam Centre (36.9 persons/ha) and Metrotown (33.5 persons/ha). Coquitlam, Langley and Richmond town centres experienced more than a 50% increase in their respective population densities. The Vancouver metropolitan core also experienced a large absolute and percentage increase in density. By 2001, the eight regional town centres had an average population density of 50.4 persons/ha. Metrotown, the metropolitan core and Lonsdale all have distinctly higher densities than the other centres, with Metrotown being the densest at nearly 110 persons/hectare.

Density is a function of land area and population, so it is important to note that the size of the centres varies widely, which has a significant impact on the density "ranking" of each centre, and more generally on its approach to accommodating growth. Older centres such as New Westminster and Lonsdale are largely built out, and must rely to a significant degree on re-development and infill to grow. The relatively high growth in density experienced in Coquitlam town centre in part reflects its compact size, and the fact that it is the most recently developed of the major centres. Similarly, the relatively low density of Langley Town Centre reflects, in part, the fact that it is the

largest of all regional town centres. While the Vancouver metropolitan core ranks second in absolute density, the fact that it is over four times the size of Metrotown confirms that downtown and uptown Vancouver stand out as the largest concentration of people in the region.

Taken together, the increased population density observed in the region's major centres is consistent with the growth management objectives of the LRSP. However, the individual results vary widely and likely for a range of reasons. It was known during the crafting of the LRSP that different centres would mature at different rates, and would ultimately play different functions within their communities. This may be what is reflected in the preceding numbers. It may nevertheless be worthwhile considering additional ways of measuring the growth of Greater Vancouver's centres to address these differences, facilitate comparative analysis, assess how well the individual centres are achieving the region's growth management objectives for them, and determine the appropriate services and support they need to help them grow sustainably.

6. TRANSIT CORRIDOR POPULATION DENSITY

A policy objective of the Livable Region Strategic Plan is to concentrate population growth within transportation corridors, in particular the region's transit corridors. The following table summarizes the growth in population density in the Expo Line SkyTrain corridor, based on 500 metre and 1000 metre station areas. Also included are the 2001 figures for the new Millennium Line SkyTrain corridor.

Table 6. Population Density in Rapid Transit Corridors: 1991-2001

Transit Corridor	Land Base (ha)	Population Density (persons/ha)				Change in Density 1991-2001	
		1986	1991	1996	2001	Actual	Percent
Within 500m of Expo Line Stations	1,544	29.9	33.6	42.0	48.9	15.3	45.6%
Within 1000m of Expo Line Stations	4,184	34.4	38.3	45.0	50.7	12.4	32.4%
Within 500 m of Millennium Line Stations	826	n/a	n/a	n/a	25.6	n/a	n/a
Within 1000 m of Millennium Line Stations	2,254	n/a	n/a	n/a	27.9	n/a	n/a

Note: The land base is net of Green Zone area, where applicable.

The population density of the Expo Line corridor (illustrated in Attachment 2) based on 500 metre station areas rose by the same amount as the average for the regional town centres (15.3 persons/ha), achieving a density in 2001 of 48.9 persons/ha, just under the RTC average of 50.4 persons/ha. The 1000 metre station area corridor also experienced strong growth in density, and in 2001 was slightly denser than the 500 metre corridor, although the difference in density between the 500 m and 1000 m corridors has declined. It should be noted that the population densities of individual station areas vary widely, with some being considerably more developed than others. The recently completed Millennium Line SkyTrain extension (which opened in mid-2002) had a 2001 population density of 27.9 persons/ha within 1000 metres of its stations. This is roughly similar to the Expo Line's population density in its initial year (1986), when it had a density of

34.4 persons/ha in its 1000 m station areas. If the Millennium Line corridor grows comparably with the Expo Line, it too will make a significant contribution to the region's goal to concentrate population growth along transit corridors.

The region's goal to focus growth within transportation corridors is not confined to just the rapid transit corridors. Bus corridors are also key locations to concentrate growth, especially along the higher capacity transit routes, such as the limited stop, articulated "B-line" services (eg. the 98B-Line, which started revenue service in September 2001). Comprehensive data on population densities within the region's transit corridors should be further developed and tracked to assist in the implementation of the region's land use and transportation objectives.

7. TOWARDS 2021

As noted earlier, the LRSP does not contain explicit density targets for the region. However, if it can be assumed that the land base outside the Green Zone remains relatively constant over the life of the plan, the 2021 population target for the region would then suggest an overall density of about 31 people/ha, which is essentially the same as the Burnaby/New Westminster sub-region's density as of 2001 (30.6 persons/ha). Similarly, the 2021 population target for the Growth Concentration Area suggests an overall population density in that area of about 46 persons/ha, which is somewhat less than the density for the Vancouver/UEL sub-region in 2001 (50.9 persons/ha). Based on the figures provided in this paper, it would seem the region is well on the way to achieving these kinds of densities. The ultimate results will depend on population, housing and household trends, preservation of the Green Zone, and a sustained commitment to pursuing compact communities, amongst other factors. Achieving these densities would almost certainly mean continued strong growth in the number of duplexes, rowhouses and apartments throughout the region, more residential infill and secondary suites, more mixed-use development in previously single use areas, and more re-use of former industrial lands and underutilized commercial development. Strategic transportation investments to reinforce the desired land use pattern will also play a key role in meeting the region's growth management objectives.

8. CONCLUSION

This paper has reviewed how Greater Vancouver's population density has changed over the last decade, and related the observed patterns to the growth management objectives of the Livable Region Strategic Plan. Overall, it would seem that the LRSP's objective to increase residential densities is being realized. The rate of progress varies considerably throughout the region, which may have some implications for the timing and ultimate success of the policy. Further research and analysis of the trends is warranted, together with an exploration of options that would help every part of the region accommodate growth in a manner consistent with the region growth strategy, and reflective of local context.

CALCULATION OF LAND BASE

The land base used for calculating population density in this study consists of lands used for residential, mixed-use which includes residential, commercial, industrial, community centres, schools, and neighbourhood parks. Also included are "open and undeveloped" lands outside the Green Zone. The region's lakes and other water bodies are excluded from all land area calculations.

This land base was derived by combining selected generalized land use categories used in the GVRD's 2001 Land Use Map. The following land use categories were included in the land base:

Residential – Single Family
Residential – Townhouse and Low-Rise Apartments
Residential – High-Rise Apartments
Rural Residential[1]
Commercial
Commercial – Residential Mixed
Industrial
Institutional
Recreation & Protected Natural Areas[2]
Transportation/Communications/Utilities[3]
Open Space and Undeveloped[4]
Extractive Industry

All lands within the regional Green Zone are excluded from the population density land base calculations. The Green Zone contains the following land use categories:

Agriculture
Harvesting and Research
Protected Regional Watershed

[1] The Land Base includes Rural Residential lands located outside the Agricultural Land Reserve. As of 2001, approximately 68% of all Rural Residential lands were included in the Land Base.

[2] The Land Base includes parks and greenways outside the Green Zone which are considered to be ancillary to residential land uses.

[3] The Land Base includes Transportation, Communication and Utility lands outside the Green Zone.

[4] The Land Base includes Open Space and Undeveloped lands outside the Green Zone.

GREATER VANCOUVER'S REGIONAL TOWN CENTRES